PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
154264/HT/KR		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/NO 03/00183	05.06.2003	05.06.2003
International Patent Classification (IPC) or both national classification and IPC		
H04L12/66		
Applicant		
TELEFONAKTIEBOLAGET LM ERICSSON et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
29.12.2004	06.10.2005
Name and mailing address of the international preliminary examining authority:	Authorized Officer
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NO 03/00183

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1, 3-8	as originally filed
2, 2a	received on 12.08.2005 with letter of 12.08.2005

Claims, Numbers

1-6	received on 12.08.2005 with letter of 12.08.2005

Drawings, Sheets

1/2, 2/2	as originally filed

2. With regard to the **language,** all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   - ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
   - ☐ the language of publication of the international application (under Rule 48.3(b)).
   - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   - ☐ contained in the international application in written form.
   - ☐ filed together with the international application in computer readable form.
   - ☐ furnished subsequently to this Authority in written form.
   - ☐ furnished subsequently to this Authority in computer readable form.
   - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
   - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   - ☐ the description, pages:
   - ☐ the claims, Nos.:
   - ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-6
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-6
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-6
	No:	Claims	

2. Citations and explanations

   see separate sheet

to section V.

1. The present invention relates to a method within telecommunication networks where time division multiplexed traffic is compressed at the transmitting parties and transported over packet switched networks and to the corresponding method where time division multiplexed traffic is decompressed at the receiving parties when transported over packet switched networks, according to the features of the amended independent claims 1 and 4 respectively.

2. The closest prior art document is considered to be document WO-A-01 47199 (first document cited in the international search report) and is acknowledged in the opening part of the description.

3. According to the features of the independent claims the inventive step consists in compressing time division multiplexed traffic on the transmitting side by removing idle timeslot data from the time division multiplexed traffic and adding signalling data, regarding which idle timeslot data have been removed and on the receiving side decompressing the compressed time division multiplexed traffic by inserting prefixed idle pattern data into the received data packets using the received signalling data.

   The underlying concept is not disclosed in or rendered obvious by the cited prior art documents. The subject-matter of the independent claims thus fulfils the requirements of Article 33 PCT.

4. The dependent claims contain further details on the subject-matter of the respective independent claims. These dependent claims merely limit the scope of protection sought by the independent claims and are therefore also considered to fulfil the requirements of Article 33 PCT.

equipment such as MSCs, BSCs etc. towards a packet switched network as an intermediate solution. Then in a later step, when the packet based technology is considered mature for real time applications on site, the change to an "all packet switched" scenario could be regarded reasonable. A problem when transporting TDM over packet based networks is the bandwidth utilization in the transport network. With Time Division Multiplexing, the connections are separated in timeslots. Depending on the traffic load situation, there will be a variable numbers of timeslots not carrying any traffic (they are IDLE). Even though there are time-slots not carrying traffic, these timeslots are today filled with a so-called "Idle Pattern", "Idle pattern" is a fixed bit pattern and it is used in synchronous systems where there can not be any "holes" in the data stream, and transmitted through the network.

A draft to the Internet Engineering Task Force (IETF) describing the concept TDM over IP has been posted. (TDM over IP, Yaakov (Jonathan) Stein et al. March 2003) In this draft there is also a suggestion as to what the protocol stack could look like. The mentioned drafts have no option for dynamic IP bandwidth reduction. There are methods for transporting parts of a trunk (24/32 timeslots), but in a more static way. The described method is rather complicated, introducing a lot of extra overhead etc.

In WO 01/47199 A1 it is disclosed a solution for bandwidth reduction for TDM traffic over packet or cell based networks. The invention discloses a first apparatus on a transmitting side, utilizing a buffer for TDM traffic, the content of the buffer is compared with prefixed bit patterns. Bit patterns in the buffer that matches prefixed bit patterns is removed from the buffer. Further the first apparatus removes idle cells before the traffic enters the cell or packet based network. The invention further discloses a second apparatus adapted to receive the

cell/packet based traffic and reproduce the original TDM traffic.

The present invention describes a solution to avoid the transmission of the timeslots carrying Idle Pattern and hence reducing the average size of IP packets transmitted. The IP bandwidth reduction requires that information is being sent from the transmitting party to the receiving party, about which timeslots are, at a given moment, not carrying traffic. Equipment existing today provides information about whether a timeslot contains traffic or not.

The present invention uses this information to avoid transmitting timeslots not carrying traffic.

Patent claims

(amended 2005-08-11)

1. Method within telecommunication networks where time division multiplexed traffic is transported over packet switched networks comprising one or a number of transmitting parties
characterized in that the one or more transmitting parties executes the steps of:

a) compressing time division multiplexed traffic by removing idle, i.e. unused, timeslot data from time division multiplexed traffic and

b) adding signalling data, regarding which idle timeslot data that have been removed, to free bits, and/or bits having prefixed values in a timeslot 0 of a time division multiplex frame.

2. Method according to claim 1,
characterized in that the one or more transmitting parties further executes the step of:

encapsulating the compressed time division multiplex frames into data packets and forwarding the data packets over the packet switched network.

3. Method according to any of the previous claims,
characterized in that the packet switched network is one of the following networks:

Internet Protocol network, Multi Protocol Label Switching, Asynchronous Transfer Mode or Frame relay.

4. Method in telecommunication networks where compressed time division multiplexed traffic is transported over packet switched networks comprising one or a number of

receiving parties
c h a r a c t e r i z e d i n that the receiving party executes the step of:

decompressing the compressed time division multiplexed traffic transported over the packet switched networks, where the time division multiplexed traffic is encapsulated in data packets, by inserting prefixed idle pattern data into received data packets using received signalling data in time slot 0 of a time division multiplex frame regarding where idle timeslot data have been removed.

5. Method according to claim 4,
c h a r a c t e r i z e d i n that the one or more receiving parties further executes the step of:

decapsulating the decompressed packet switched traffic into time division multiplex traffic.

6. Method according to any of the claims 4-5,
c h a r a c t e r i z e d i n that the packet switched network is one of the following:

an Internet Protocol network, Multi Protocol Label Switching, Asynchronous Transfer Mode or Frame relay.